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A New Species of *Thalictrum* (Ranunculaceae) from Western Honshu, Japan

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A new species of *Thalictrum* (Ranunculaceae), *T. kubotae* Kadota, is described from Hiroshima Pref., western Honshu, Japan. *Thalictrum kubotae* is distinguished from *T. foetidum* var. *glabrescens* in having stipels, persistent sepals, white staminal filaments and leaflets with slightly raised midribs and lateral veins on the abaxial side. *Thalictrum kubotae* is discriminated from *T. minus* var. *sekimotoanum* in having persistent sepals, a shorter and non-viscid plant body, pendulous flowers and longer pedicels at fructescence. *Thalictrum kubotae* occurs in a limestone area in the east of Hiroshima Pref.

Key words: Japan, limestone, new species, *Thalictrum kubotae*, *Thalictrum minus*.

In May of 2005 a living plant of *Thalictrum* was sent to me by Dr. Masahiko Kubota for identification. This plant was collected by him in the limestone area around the Taishaku-kyô Gorge, Hiroshima Pref., western Honshu, Japan. At a glance I noticed that this plant had persistent sepals (tepals). Keeping the plant in a glass chamber for five days, I confirmed that the sepals are persistent. Among the Japanese species of *Thalictrum* only *T. rochebrunianum* Franch. & Sav. is hitherto known to have persistent sepals (Tamura 1953, Kitamura and Murata 1961, Emura 1972, Shimizu 1982, Kadota 2005). The other known species of Japanese *Thalictrum* (except for *T. rochebrunianum*) have caducous sepals; i. e., sepals drop off within a day after flowering. Hence this plant in question is characterized by having persistent sepals. After taxonomic examination it was concluded that this plant represents a new species. The aim of this paper is to describe this new species.

Taxonomic treatment

Thalictrum Tourn. ex L., Gen. ed. 1, 164 (1737).

Sect. **Thalictrum**: DC., Syst. Nat. **1**: 172 (1817) – Tamura in Acta Phytotax. Geobot. **43**: 56 (1992); Pflanzenfam. **17 a IV**: 483 (1995) – Kadota, Fl. Jap. **IIa**: (2005).

Thalictrum kubotae Kadota, sp. nov. [Figs. 1, 2]

Herba perennis, glandulifera, rhizomatosa, 30–40 cm alta. Rhizoma circa 4 mm in diametro, horizontale, squamis brunneis membranaceis, radicibus fibrosis non incrassatis. Caulis declinatus, 1–2-plo ramosus, dense glandulifer, squamis brunneis membranaceis, estolonifer. Folia basalia emarcida sub anthesin. Folia caulina 4–5, biternata vel quinqueternata, laminiis 4–16 cm longis 4–22 cm latis, foliolis late obovatis vel anguste obovatis 12–33 mm longis 9–22 mm latis tricuspidatis, chartaceis, inferne costus et venis lateralibus errigentibus, mucronatis, cuneatis vel rotundatis, utrinque glanduliferis, leviter foetidis, petiolis (3–)15–30 mm longis glanduliferis, stipulis 3–5 mm longis atrobrunneis membranaceis vaginatis, stipellis late ovatis circa 1 mm longis atrobrunneis membranaceis. Inflorescentiae paniculatae, 7–17 cm longae, bracteis foliaceis simplicibus vel biternatis, bracteolis lanceolatis circa 2 mm longis circa 1 mm latis dilute purpureo-brunneis, pedicellis 1.5–2 cm longis glanduliferis. Flores 1–1.5 cm in diametro, penduli. Sepala 4, oblongi, 4–5 mm longi, circa 1 mm lati, dilute purpureo-brunnei, venis fuscatibus, persistentes. Stamina 10–12, 7–12 mm longa, antheris anguste ellipsoideis, 2–5 mm longis, obscure flavis, filamentis 4–8 mm longis albis, connectivis dilute pupureo-brunneis exsertis. Styli 1–1.5 mm longi, stigmatibus triangularibus. Achenia circa 3 mm longa, fusiformia, glandulifera, non compressa, 4-costata, obliqua, sessilia, rostriis circa 1 mm longis sagittatis. Numerus chromosomatum 2n = 42.

TYPE: JAPAN: Honshu, Hiroshima Pref., Jinseki-gun, Jinsekikôgen-cho, Aido, alt. ca. 400 m, 14 May 2005, fl., M. Kubota s. n. (TNS 748330–holotype; Fig. 2); Jinsekikôgen-cho, Aido, alt. 405 m, 5 June 2005, fr., M. Kubota s. n. (TNS 749418–paratype).

A perennial, glandular hairy, rhizomatous herb, 30–40 cm tall. Rhizome ca. 4 mm in diameter, horizontal, covered with brownish membranaceous scales; roots fibrous, not thickened. Stem declining, 1–2 times branched, densely glandular hairy, enclosed by brownish membranaceous scales at base, without stolons. Basal leaves withering at anthesis. Cauline leaves 4–5, biternate to quinqueternate; blades graysih green on the adaxial side, glaucous on the abaxial side, 4–16 cm long, 4–22 cm wide; leaflets broadly obovate to obovate or narrowly obovate, 12–33 mm long, 9–22 mm wide, tricuspidate or sometimes shallowly trilobed with coarsely serrate lobes, chartaceous, midribs and lateral veins rised on the abaxial side, mucronate at apex, cuneate to rounded at base, densely glandular hairy on the abaxial side, sparingly glandular hairy on the adaxial side, faintly foetid; petioles (3–)15–30 mm long, densely glandular hairy; stipules 3–5 mm long, dark brown, membranaceous, vaginate; stipels broadly ovate, ca. 1 mm long, dark brown, membranaceous. Inflorescences paniculate, 7–17 cm long; bracts foliaceous, simple to biternate; bracteoles ovate, ca. 2 mm long, ca. 1 mm wide, pale purplish brown; pedicels 1.5–2 cm long, glandular hairy. Flowers May to June, 1–1.5 cm in diameter, pendulous. Sepals 4, oblong, 4–5 mm long, ca. 1 mm wide, pale purplish brown with darker veins, persistent. Stamens 10–12, 7–12 mm long; anthers narrowly ellipsoidal, 2–5 mm long, dull yellow; filaments filiform, 4–8 mm long, white; connectives pale purplish brown, exserted at apex. Styles 1–1.5 mm long; stigmata triangular. Achenes 1–2 per flower, ca. 3 mm long, fusiform, glandular hairy, not compressed, 4-ribbed on both sides, oblique, sessile; beaks ca. 1 mm long, sagittate. Chromosome number 2n = 42.

Japanese name: Taishaku-karamatsu (nom. nov.).

Other specimens examined: JAPAN: Honshu, Hiroshima Pref., Jinseki-gun, Jinsekikôgen-cho, Aido, Kashiwa-iwa, 11 July 2004, fr., N. Hamada s. n. (TNS 749440). Shôbara-shi, Tôjô-cho, Misaka, 27 May 2001, fl., N. Hamada s. n. (TNS 749438–749439).

The specific epithet "*kubotae*" is dedicated to Dr. Masahiko Kubota, who gave me the opportunity to study and describe this new species.

Thalictrum kubotae is characterized by having 1) persistent sepals (tepals), 2) glandular hairs on stem, leaves, inflorescences and achenes, 3) stipels and 4) earlier flowering time (May to June). As already stated among the species of Japanese *Thalictrum* exclusively *T. rochebrunianum* Franch. & Sav. [Sect. Purpurea (Tamura) Emura; cf. Kadota 2005] has persistent sepals.

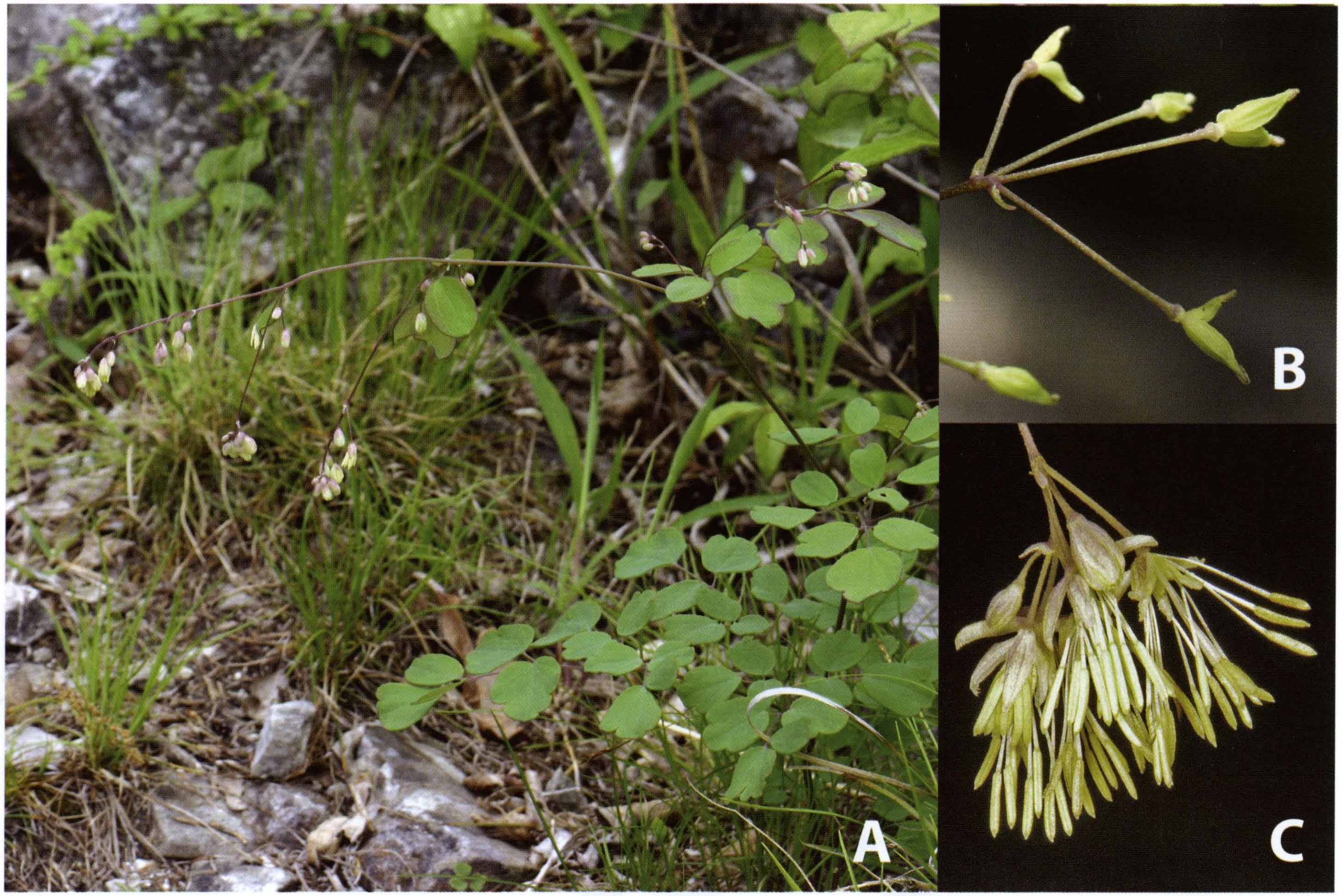

Fig. 1. *Thalictrum kubotae* Kadota (JAPAN: Honshu; Hiroshima Pref., Jinseki-gun, Jinsekikôgen-cho, Aido, 14 May 2005, courtesy of Dr. M. Kubota). A: Growth habit. B: Part of fructescence. C: Part of inflorescence showing pendulous flowers.

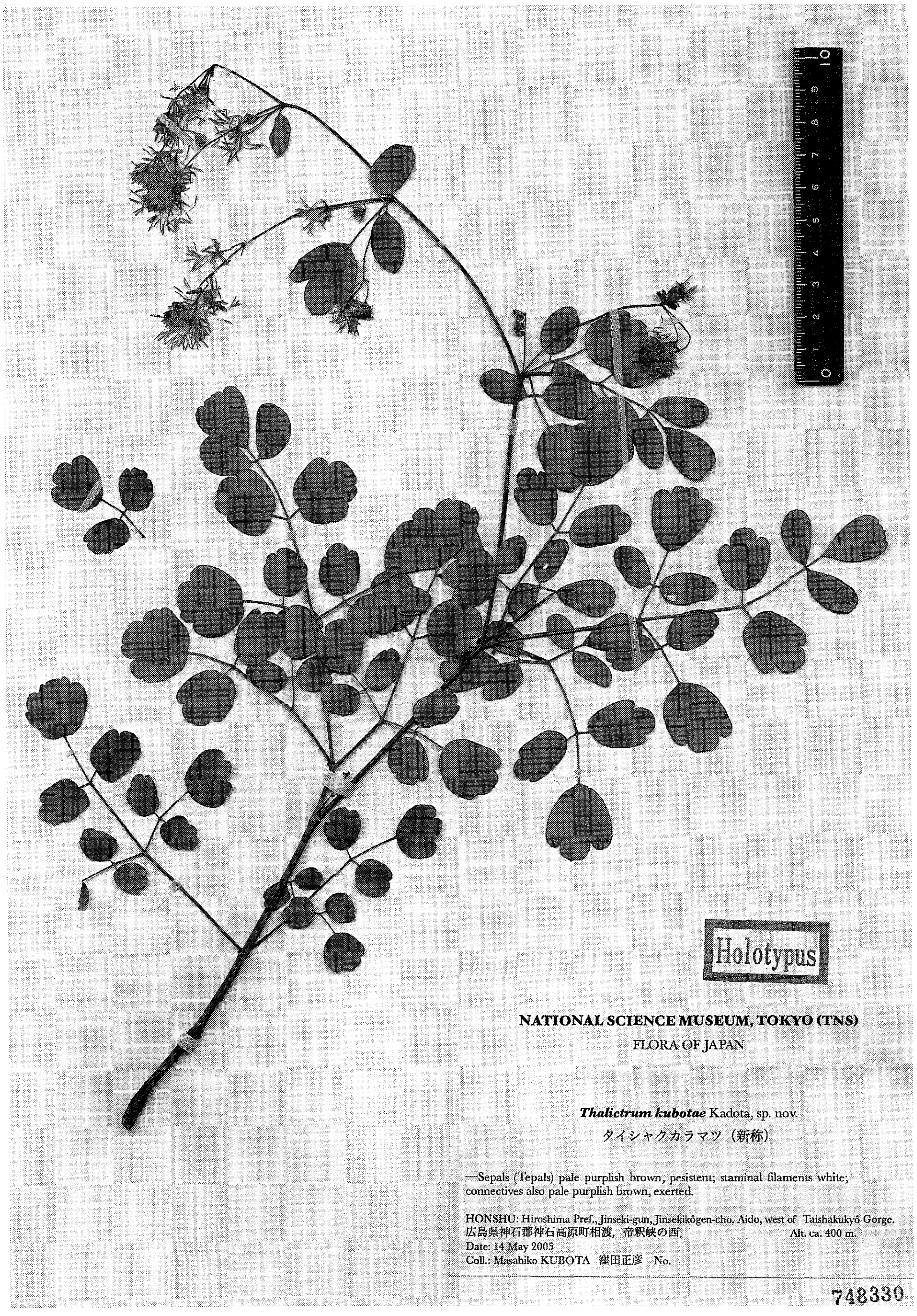
Holotypus
NATIONAL SCIENCE MUSEUM, TOKYO (TNS)
FLORA OF JAPAN
Thalictrum kubotae Kadota, sp. nov.
タイシャクカラマツ（新称）
—Sepals (Tepals) pale purplish brown, pesistent; staminal filaments white; connectives also pale purplish brown, exerted.
HONSHU: Hiroshima Pref., Jinseki-gun, Jinsekikôgen-cho. Aido, west of Taishakukyô Gorge.
広島県神石郡神石高原町相渡，帝釈峡の西， Alt. ca. 400 m.
Date: 14 May 2005
Coll.: Masahiko KUBOTA 窪田正彦 No.
748330

Fig. 2. Type specimen of *Thalictrum kubotae* Kadota (JAPAN: Honshu; Hiroshima Pref., Jinseki-gun, Jinsekikôgen-cho, Aido, 14 May 2005, M. Kubota s. n., holotype–TNS 748330).

Thalictrum rochebrunianum is distributed in central Honshu and the Korean Peninsula and clearly differs from *T. kubotae* by taller stem (1 m or higher), stipitate carpels (achenes) and brilliant purplish sepals.

The plants attributed to *T. kubotae* have been noticed to occur in the vicinity of the Taishakukyô Gorge, Hiroshima Prefecture. They were considered to belong to *T. foetidum* L. var. *iwatense* T. Shimizu (Flora of Hiroshima Prefecture 1997, Red Data Book Hiroshima 2003 2004) or to *T. sekimotoanum* Honda [= *T. minus* L. var. *sekimotoanum* (Honda) Kitam.; Kadota 2005] (Flora of Tôjyo 2004).

The name *T. foetidum* var. *iwatense* (1958) should be reduced to a synonym of *T. foetidum* var. *glabrescens* Takeda (1910; Kadota 2005). *Thalictrum foetidum* var. *glabrescens* is distributed in Hokkaido and Tohoku (Iwate Pref.) and is distinguished from *T. kubotae* by the absence of stipels, purplish brown staminal filaments and raised midribs and lateral veins on the abaxial side of leaflets.

Thalictrum minus var. *sekimotoanum* occurs in central Honshu (Chûbu and Kanto Districts) and is discriminated from *T. kubotae* by having a taller stem (50–80 cm tall), viscid plant body, erect flowers and short pedicels (2–10 mm long) at fructescence.

Thalictrum kubotae occurs exclusively among calcareous rocks around the Taishakukyô Gorege, Hiroshima Prefecture. Based on Dr. M. Kubota's observation the population size of *T. kubotae* was estimated at 40–50 individual plants and the following shrubs and herbs were found growing sympatrically at the type locality; *Pertya glabrescens*, **Viburnum carlesii* var. *bitchiuense*, *Lithospermum zollingeri*, *Ajuga nipponensis*, *Pieris japonica*, **Buxus microphylla* var. *insularis*, *Staphylea bumalda*, *Kerria japonica*, **Spiraea dasyantha*, **Chloranthus fortunei*, *Arabis flagellosa*, *Hepatica nobilis* var. *japonica* f. *variegata*, *Juglans mandshurica* var. *sachalinensis*, *Polygonatum lasianthum*, *Chionographis japonica*, **Smilax sieboldii*, **Asplenium ruta-muraria*, etc. (the names preceded by asterisks show calciphilous plants).

I am deeply indebted to Dr. Masahiko Kubota, Hiroshima Prefecture, for his gift of living material, specimens, beautiful photographs and valuable information on *Thalictrum kubotae*; to Mr. Nobuya Hamada for his specimens and also valuable information on *T. kubotae*; to Prof. Dr. Tsunehiko Nishikawa, Hokkaido University of Education, for his counting of the chromonosome number of *T. kubotae*. I should also thank the Curators of the Herbaria (TI and TNS).

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門田裕一：日本産カラマツソウ属（キンポウゲ科）の一新種，タイシャクカラマツ

広島県帝釈峡の石灰岩地域からキンポウゲ科カラマツソウ属の新種，タイシャクカラマツ *Thalictrum kubotae* Kadotaを記載した．タイシャクカラマツは，無柄で直立ないし斜上する（懸垂しない）瘦果を付け，葯隔の先端が突出することでアキカラマツ節に分類される．この節において，1）萼片（花被片）が宿存性で，2）植物体全体に腺毛が密に分布し，3）小托葉をもち，4）花期が５月から６月と早いことなどがタイシャクカラマツの特徴である．日本産カラマツソウ属において，宿存性の萼片をもつ種はこれまでシキンカラマツ *T. rochebrunianum* Franch. & Sav. ただ一種が知られているのみであった．したがって，宿存性の萼片をもつことがタイシャクカラマツの最も著しい特徴であるということができる．なお，シキンカラマツは本州中部と朝鮮半島に分布し，高さは普通1 m以上になり，萼片は鮮やかな紫色で，心皮（瘦果）に柄がある点で，容易にタイシャクカラマツと区別できる．

この植物が帝釈峡とその付近に生育すること自体は既に知られていて，これまでニオイカラマツ *T. foetidum* L. var. *iwatense* T. Shimizu（広島県植物誌 1997，改訂・広島県の絶滅のおそれのある野生生物－レッドデータブックひろしま2003－2004）あるいはイワカラマツ *T. minus* L. var. *sekimotoanum* (Honda) Kitam.（広島県東城町植物誌 2004）とみなされてきた．ニオイカラマツはチャボカラマツ *T. foetidum* var. *glabrescens* Takedaの異名であると考えられ（Kadota 2005），チャボカラマツは北海道と岩手県に分布し，小托葉を欠き，花糸が帯紫褐色で，葉脈が背軸側に強く隆起する点などでタイシャクカラマツと異なる．また，イワカラマツは本州中部（中部・関東地方）に分布し，植物体は高さ50–80 cmほどになり，腺毛が植物体全体に密生して粘着し，花は直立して咲き，果柄が長さ2–10 mmと短いなどの点でタイシャクカラマツと異なっている．

（国立科学博物館植物研究部）